4 January 2023

To the Reviewers:

We would like to thank the two reviewers of this manuscript for their careful consideration of our work and helpful suggestions for improvement. In the revised manuscript we are resubmitting, we have addressed every reviewer comment in the manner specified below.

***Reviewers' comments:***

***Reviewer #1:***

*Authors have made a great effort for improving their manuscripts. I observe that they have more particularly improved the statistical analysis. They have also tried to take into account of my own suggestion for formulating the hypothesis that a part of the "uncertainty" in the mono-phasic N dilution curve could be due to the fact that the true model would be bi-phasic? Authors have mentioned clearly this hypothesis... BUT they did not try to go further...! I think that without any more modification in their manuscript, authors should try to provide in "suplemental material" a log-log graph showing if yes or not the log%N-logBiomass is mono-phasic or bi-phasic? This information is important for discussing the "Genotype-Environment".... Perhaps the difference in the slopes (b1 vs b2) is low or undetectable and then the mono-phasic model is a good approximation.... or perhaps this difference is high enough and then it could lead to high uncertainty?*

*My own opinion is that the paper could be accepted in its present form, but that it would be a pity to not include this more fundamental aspect in the discussion of such a paper.*

* *We thank the Reviewer for their insightful comments on this important research question that is worthy of follow-up investigation. However, we have chosen not to change the manuscript in response to this comment for the following reasons. First, data for this manuscript were aggregated on a whole plant basis (i.e., vines and tubers combined) (Table S2). Data segregated between vine and tuber for biomass and nitrogen concentration are not presently available for all studies included in this manuscript. Second, we find that the suggestion that the Reviewer is making is fundamentally outside of the primary scope of the present manuscript. Our contribution is focused on the novel application of statistical methods to detect differences in N dilution across G x E x M effects. While this question posed by the reviewer is necessarily related to the investigation of the source of variation in dilution across G x E x M effects, it is adjacent to our primary focus. In essence, we concur with the suggestion of Reviewer 2 from their comments on the original manuscript draft that “*the paper [is] excessively (and unnecessary) long in several sections, so my first main suggestion is to reduce the length of the manuscript reorganizing paragraphs and ideas … Similarly, I would suggest reducing the number of figures considering the complexity of the methodology and number of panels. I believe the paper will have more impact if ideas (including figures) are more succinct.*”* *We hope to answer this important, although adjacent, research question suggested by Reviewer 1 in a subsequent manuscript while maintaining focus on the core research questions addressed in the current manuscript.*

*Specific Comments:*

* *4. Could the manuscript benefit from additional tables or figures, or from improving or removing (some of the) existing ones? – YES, I think that it should be important to test if the N dilution curve for potatoes is monophasic or bi-phasic....according to "only vegetative" and "vegetative+tuber" development as I suggested in my previous reviewing. This test should be realized in the discussion paragraph in order to know if part of uncertainty of the "mono-phasic" dilution model could be explain by variations in the phenology of cultivars?*
* *Addressed in comments above.*
* *7. Have the authors clearly stated the limitations of their study/theory/methods/argument? – See above remarks*
* *Addressed in comments above.*

***Reviewer #2:***

*Authors addressed all suggested changes in the manuscript; I appreciate that the authors considered my comments. From my perspective the manuscript did improved considerably, and I recommend it to be accepted for publication.*

* *Thank you once again for the previous suggestions and comments. We agree that the manuscript has improved considerably as a result of suggestions from both Reviewers.*